Childhood Lead Poisoning in 1994

Lead poisoning is one of the worst environmental threats to children in the United States and is also entirely preventable.[1] An increased understanding of the adverse effects of lead poisoning—neurological, endocrinological, hematological, reproductive, and growth—resulted in the Centers for Disease Control and Prevention lowering the acceptable blood lead level three times in the last 20 years.[2]

The article by Pirkle et al[3] documents the dramatic decrease in blood lead levels from 0.62 to 0.14 μmol/L (12.8 to 2.8 μg/dL) between 1976 to 1980 and 1988 to 1991. Most significantly, the percentage of US children aged 1 to 5 years with blood lead levels 0.48 μmol/L (10 μg/dL) or greater decreased from 88.2% to 8.9%. Decreases in blood lead levels occurred for all age and income groups. This is surely one of the most remarkable public health achievements of the decade and is undoubtedly the result of government action to reduce lead exposures from gasoline, drinking water, house paint, and consumer products.

Some would argue, based on these favorable trends, that it is time to declare victory in the war against lead poisoning. However, the article by Brody et al[4] tells a different story, one of disproportionate exposures for young children, minorities, and the poor. From 1988 to 1991, 4.5% of the US population had blood lead levels 0.48 μmol/L (10 μg/dL) or greater. However, 11.5% of children aged 1 to 2 years had blood lead levels of 0.48 μmol/L (10 μg/dL) or greater, with the highest rates among black, low-income, and urban children.

See also pp 277 and 284.

These are the children who historically have borne the greatest burden of lead exposure. Often, these children live in older, poorer-quality homes and are exposed to the single most concentrated source of lead—paint and dust in homes. It is a sad injustice then that the children who are most disadvantaged to begin with are then further disadvantaged by increased exposure to lead.

The US strategy must begin to focus more than ever on poor, nonwhite, and inner-city children. We must intensify our efforts to screen these children, identify the sources of lead exposure, and eliminate or reduce these exposures. Many of these children do not have access to routine medical care, so we must make special efforts to reach these families.

While reduction of childhood lead exposure will always be our first priority, we must also focus on primary prevention—steps to prevent exposure in the first place. We must identify lead paint and dust hazards and eliminate them. We must also ensure that home renovation and remodeling are done properly so that no new lead hazards are created.

The US Department of Housing and Urban Development[5] estimates that there are 17 million privately owned and occupied homes built before 1980, that about three quarters contain lead-based paint, and about 10% are currently occupied by children younger than 7 years. About two of three homes occupied by young children have lead paint and/or dust hazards.[5]

To help address this problem, Congress passed the federal Residential Lead-Based Paint Hazards Reduction Act of 1992, which calls for disclosure of lead-based hazards when real property changes hands and for information on lead in homes to be distributed by remodelers or renovators before they begin work. These efforts should greatly increase public awareness of the dangers of lead poisoning.

The federal government in partnership with the states is building an infrastructure to provide the public with reliable services for identifying lead-based paint, assessing the hazard, and providing assistance on abatement and remodeling. Guidelines for testing and abatement, lead inspector training programs, and laboratory accreditation programs are being developed. In addition, the Environmental Protection Agency and the Department of Housing and Urban Development have developed educational materials and established a hot line to assist the public with a range of issues on lead.

As we intensify our focus on lower-income households, it will also be important to encourage and evaluate better and less expensive technologies for testing and abatement. Currently, the Centers for Disease Control and Prevention is funding screening programs and the development of new technologies for determining blood lead levels.

What are the implications for the medical community? Since 1991, the Centers for Disease Control and Prevention has recommended that all children be screened for lead poisoning, although these recent data would indicate the need for a more targeted approach. However, while we would all agree that the most serious threat lies with minority, urban, and low-income children, there is still much evidence that the problem does not stop there. Sources of lead poisoning can be found anywhere—from turn-of-the-century homes that are being remodeled to the ingestion of lead in folk remedies[6]—and it is difficult for an individual physician to determine that a community is "lead safe." We need both targeted screening efforts and improvements in screening methods[7] to facilitate routine lead screening.

From the Office of Prevention, Pesticides, and Toxic Substances, US Environmental Protection Agency, Washington, DC

Reprint requests to US Environmental Protection Agency, 401 M St SW, Washington, DC 20460 (Dr Goldman)

The results highlighted in these articles dramatically demonstrate that real public health improvements can be accomplished through concerted government action. These actions followed major battles that were fought and won in Washington. Achieving further dramatic gains in the war against childhood lead poisoning will require armies of people fighting small battles—house to house—in many communities in this country. It will require education and involvement. It will require a commitment to environmental justice and ensuring a safe, healthy environment of these communities for all children.

Lynn R. Goldman, MD, MPH
Joseph Carra, MS

1. American Academy of Pediatrics, Committee on Environmental Health. Lead poisoning: from screening to primary prevention. *Pediatrics*. 1993;92:176-183.
2. Centers for Disease Control. *Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control*. Atlanta, Ga: US Dept of Health and Human Services, Public Health Service; 1991.
3. Pirkle JL, Brody DJ, Gunter EW, et al. The decline of blood lead levels in the United States: the National Health and Nutrition Examination Surveys (NHANES). *JAMA*. 1994;272:284-291.
4. Brody DJ, Pirkle JL, Kramer RA, et al. Blood lead levels in the US population: phase 1 of the third National Health and Nutrition Examination Survey (NHANES III, 1988 to 1991). *JAMA*. 1994;272:277-283.
5. US Dept of Housing and Urban Development. *Comprehensive and Workable Plan for the Abatement of Lead-based Paint in Privately Owned Housing: A Report to Congress*. Washington, DC: US Dept of Housing and Urban Development; 1990.
6. Markowitz SB, Nunez CM, Klitzman S, et al. Lead poisoning due to *hai ge fen*: the porphyrin content of individual erythrocytes. *JAMA*. 1994;271:932-934.
7. Schlenker TL, Fritz CG, Mark D, et al. Screening for pediatric lead poisoning: comparability of simultaneously drawn capillary and venous blood samples. *JAMA*. 1994;271:1346-1348.

Suboptimal Medication Use in the Elderly

The Tip of the Iceberg

The problem of inappropriate prescribing of medications to older patients is widely acknowledged and has been publicized by professional societies, governmental organizations, advocacy groups for the elderly, and the media. However, the true magnitude of the problem remains unclear. Although the use of antipsychotic medications in the nursing home setting has come under considerable scrutiny,[1] it is generally recognized that suboptimal prescribing to the elderly extends well beyond excessive prescribing of this single drug category. Yet, to date, information regarding the quality of drug prescribing to geriatric patients in other clinical settings has been extremely limited, and claims about suboptimal prescribing have been based more on anecdote and conjecture than on actual data. Which pharmacotherapeutic domains comprise the most serious problem areas and how frequently inappropriate prescribing actually occurs are just some of the questions that need to be more fully answered to develop strategies to improve the quality of medication use in older patients. In this issue of THE JOURNAL, Willcox and colleagues[2] have shed some light on these questions by applying explicit criteria defining inappropriate medication use to data derived from the 1987 National Medical Expenditure Survey.

In 1991, Beers et al[3] published explicit criteria for determining inappropriate medication use in nursing home residents. These criteria were developed through the consensus of 13 experts in clinical geriatric pharmacology, psychopharmacology, pharmacoepidemiology, clinical geriatrics, and long-term care. Two aspects of medication use were emphasized in designing these criteria: (1) individual medications or drug categories that should be avoided in nursing home residents except under unusual circumstances, and (2) doses, frequencies, or durations of medication prescriptions that should not be exceeded. These criteria were particularly designed to examine computerized medication data assuming limited availability of information on the clinical status of the patient. A study of 1106 residents of 12 nursing homes in the greater Los Angeles, Calif, area indicated that 40% had at least one inappropriate medication prescription based on the full list of criteria, which addressed 16 different drug categories.[4]

Although the Beers criteria have been generally well accepted, some items have been subject to controversy. The unconditional characterization of the antihypertensive agents propranolol, methyldopa, and reserpine as inappropriate has been questioned.[5] Issues concerning other drug categories (eg, nonsteroidal anti-inflammatory drugs [NSAIDs]) are only partially addressed by the criteria. Indomethacin is one of two NSAIDs specified as inappropriate, but all NSAIDs have been associated with gastrointestinal bleeding and nephrotoxicity, and this risk is probably more related to the presence of underlying clinical conditions and higher NSAID dose than which agent is prescribed.[6-8] In addition, the criteria are based on data available prior to 1990 and require some updating to incorporate more recently published literature. For example, the expert panelists participating in criteria development could not reach consensus on the appropriateness of ergoloid mesylates for Alzheimer's disease and the use of diphenhydramine as a hypnotic agent. Recent study findings would suggest that in both cases inappropriate ratings are justified.[9,10]

To estimate levels of inappropriate prescribing to community-dwelling elderly, Willcox and colleagues[2] used only a subset of the Beers criteria, a list of 20 drugs considered to be contraindicated in older patients regardless of dose, duration of therapy, or indication. These included long elimination half-life benzodiazepines and oral hypoglycemics, short-duration barbiturates, antidepressants with strong anticholinergic properties, less effective and less safe opioid analgesics (eg, propoxyphene), ineffective dementia treat-

From the Program for the Analysis of Clinical Strategies, Gerontology Division, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, Mass, and the Brockton/West Roxbury Veterans Affairs Medical Center, West Roxbury, Mass.

Reprint requests to the Program for the Analysis of Clinical Strategies, Brigham and Women's Hospital, 221 Longwood Ave, Suite 309, Boston, MA 02115 (Dr Gurwitz).